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PUBL PLANT DISEASE REPORTER 36(7), 300. BIOL. A. 27, NO. 30742, 1952.
SPEC ARCEUTHOBIIUM AMERICANUM
DIST UNITED STATES, ROCKY MOUNTAINS
MAJK BIOTIC FACTORS
MINK FUNGI
ABST FIRST REPORT OF SEPTOGLOEUM GILLII ON ARCEUTHOBIIUM AMERICANUM, LEWIS AND CLARK NAT

256 AUTH GILL, L. S.
DATE 1953.

TITL BROOMRAPES, DODDERS, AND MISTLETOES.
PUBL U.S. DEPT. AGR. YEARBOOK 1953. 73-77.
SPEC PHORADENDRON, ARCEUTHOBIIUM, SPP.

DIST UNITED STATES
MAJK POPULAR ARTICLES
ABST SEMI-TECHNICAL ACCOUNT OF PARASITIC PLANTS--BROOMRAPES, DODDERS

DISCUSSION IS ON NOMENCLATURE, FOLKLORE AND LEGENDS, PHARMACEUTICALS, AND ARCEUTHOBIIUM (HOSTS, GENERAL BIOLOGY, SEED DISPERSAL, DAMAGE)

257 AUTH GILL, L. S.
DATE 1953.

TITL DWARF MISTLETOE.
PUBL AMERICAN FORESTS 59(9), 26, SEPT. 1953.
SPEC ARCEUTHOBIIUM, SPP.
DIST UNITED STATES

MAJK POPULAR ARTICLES, DAMAGE, CONTROL
MINK YIELDS, SILVICULTURAL, PRUNING
ABST SEMI-TECHNICAL ARTICLE ON THE DWARF MISTLETOE

THE NORTHEAST AND FAR WESTERN U.S.
BLACK SPRUCE. EFFECTS ON HOST
FOR AS MUCH AS 75 FEET FROM
DO NOT OCCUR WITHIN 18 INCHES
INITIAL OPERATION IS STILL IN PROGRESS
MORE.

258 AUTH GILL, L. S.
DATE 1954.

TITL DWARFMISTLETOE
PUBL ROCKY MT. FOREST
SPEC ARCEUTHOBIIUM
DIST UNITED STATES

MAJK DAMAGE
MINK SYMPTOMS
ABST

USDA Forest Service
General Technical Report RM-30
November 1976

MISTLETOE LITERATURE OF
THE WORLD: A User's Guide to a
FAMULUS Retrieval System

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Range Experiment Station
Forest Service
U.S. Department of Agriculture
Fort Collins, Colorado 80521

SOUTHWEST.
STATION PAPER NO. 14, 1-9 P. 1954. F. ABSTR. 16(2), 1882. 1955.

CONTROL OF ARCEUTHOBIIUM VAGINATUM IN ARIZONA AND NEW MEXICO. DISCUSSION ON THE
MISTLETOE. DESCRIPTION OF THE PARASITE, INCLUDING FLOWERS (BLOOM MAY-JUNE, POLLINATION
FRUITS AND SEEDS (TAKE 15-16 MONTHS TO MATURE, RIPE IN LATE JULY OR EARLY AUGUST),
YEAR OLD HOST GROWTH MOST SUSCEPTIBLE), LIFE CYCLE (MINIMUM TIME FROM SEED DEPOSITION TO
18 MONTHS, MINIMUM TIME TO FIRST FRUITS IS 48 MONTHS), MEANS OF SPREAD (MOST INFECTION IN
WITHIN 60 FEET OF AN OVERSTORY TREE), AND EFFECT ON HOST (WITCHES BROOMS, STEM CANKERS, TRE
CONTROL SECTION DEALS WITH NATURAL CONTROL FACTORS (FIRE, INSECTS, FUNGI, PORCUPINES), CHEMICALS
MISTLETOE SHOOTS BUT NOT THE ENDOPHYTIC SYSTEM), PHYSICAL REDUCTION (THINNING, PRUNING) AND
ATTENTION FOR CONTROL IN MANAGED FORESTS

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MISTLETOE LITERATURE OF THE WORLD:
A User's Guide to a FAMULUS Retrieval System

Robert F. Scharpf,¹ Frank G. Hawksworth,² and Bernard J. Erickson²

A computer-based information retrieval system to the world literature on the mistletoes presently contains nearly 7,000 citations; about 2,100 of those are on the dwarf mistletoes. Information for each citation is included under these fields: author, date of publication, title, publication source, species of mistletoe, geographic location, major and minor keywords, and an abstract. Searches may be requested from the authors.

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MISTLETOE LITERATURE OF THE WORLD: A User's Guide to a FAMULUS Retrieval System

Introduction

Biological scientists are aware of the increasing volume of technical literature generated each year. Even in specialized fields of interest—forest pathology, for example—retrieval of published literature and keeping abreast of current information are becoming formidable tasks. As a result, scientists are relying to a great extent on computer-based information retrieval systems. Many abstracting and indexing services are now computerized. Several information centers now handle information bases relating to plant pathology (Dwinell 1970). However, a problem in retrieving information in a specialized field is that the scientist may have to search several data bases, which is costly and time consuming. To minimize these problems, specialized systems have been developed to serve the needs of researchers requiring information in a relatively restricted field.

FAMULUS (Burton et al. 1969, USDA FS 1969) is one of these systems. It is a computer-based system designed to handle the personal documentation activities of individual scientists. Examples of its use are for viral diseases of insects (Martignoni et al. 1973), and for a bibliography of lodgepole pine (Lotan and Sweet 1975). We have used FAMULUS to document a comprehensive personal index of information on a specific subject—the mistletoes.

The purposes of this user's guide are:

- To provide a means by which scientists and others can readily obtain information on the mistletoes; and
- To illustrate how FAMULUS can be used as a personal documentation system of information for the scientist.

In brief, FAMULUS consists of eight subsystems by which information can be stored, added, edited, and retrieved. The system also provides 10 fields in which the information for each citation can be included: author(s), date of publication, title of the article, and related information. A more detailed explanation of the fields used for the mistletoe index will be discussed in the section entitled "Information Base."

The Reference Collection

The value of any documentation system depends on the information it contains. The information included in this index is, for the most part, the result of several decades of intensive literature search. A review of the approximately 3,000 citations accumulated up to 1960 was published by Gill and Hawksworth (1961). The collection now contains nearly 7,000 citations, most of which are abstracted or annotated; it covers not only scientific literature on the mistletoes, but also includes items taken from annual reports of various agencies, textbooks, anonymous contributions, and even newspaper articles. Such an index needs to be updated periodically to include new and older, overlooked citations. Approximately 200 journals and abstracting systems are screened periodically. New citations are incorporated once or twice a year. Currently 300 to 400 citations are added annually.

The Information Base

The information is contained in a number of fields, and can be retrieved by various methods from these fields. The fields of mistletoe information and their abbreviations are:

Field

- 1 Author (AUTH)
- 2 Date (DATE)
- 3 Title (TITL)
- 4 Publication (PUBL)
- 5 Genus and species (SPEC)
- 6 Distribution (DIST)
- 7 Major keyword (MAJK)
- 8 Minor keyword (MINK)
- 9 Abstract (ABST)
- 10 Dummy (DUMM). (Not used at present, but may be used later.)

1. Author Field (AUTH)

This field contains the author(s), if known, otherwise a designation of "anonymous" is used. If a paper has more than four authors the first author followed by "et al" is used.

2. Date Field (DATE)

This field contains the date of publication (year). If the date of publication is not known, it is left blank.

3. Title Field (TITL)

The title field includes the complete title of the citation in its original language. If the article is in a language other than English, translation of the title is included in parentheses. For titles that cannot be typed using the Roman alphabet (Japanese, for example), only the English translation is used.

4. Publication Field (PUBL)

The publication field includes the original source of the citation. English abstracts of foreign papers and articles in less accessible journals are included as a secondary source of information.

The guide for title abbreviations (American Chemical Society 1974) as used by **Biological Abstracts** and **Chemical Abstracts** has been used for most recent citations. Many older citations are not now entered under these standard abbreviations, but we plan to convert them to this standard as time permits.

5. Genus and Species Field (SPEC)

In this field, the mistletoes are treated with regard to what we considered their importance. Thus, the most important group, *Arceuthobium* (dwarf mistletoes), is separated by individual species (Hawksworth and Wiens 1972). Two other mistletoes of importance are separated by genus; *Phoradendron*, because it is the other mistletoe occurring in North America, and *Viscum*, because it is the mistletoe most widely studied and best known. All other mistletoes are included under (1) general, a term used to designate articles dealing with several mistletoes, (2) other, or (3) unknown, when the genus and species are not known. Additional subdivision into other genera and species is possible if needed.

The genus and species field as compiled is listed below. If five or fewer species of *Arceuthobium* are mentioned in an article, each is listed. If more than five species are mentioned, the article is listed under *Arceuthobium* spp. "General" includes papers dealing with three or more genera of mistletoes.

The categories presently in the genus and species field are:

<i>Arceuthobium</i> spp.	<i>A. juniperi-procerae</i>
<i>A. abietinum</i>	<i>A. laricis</i>
<i>A. abietis-religiosae</i>	<i>A. microcarpum</i>
<i>A. americanum</i>	<i>A. minutissimum</i>
<i>A. apachecum</i>	<i>A. occidentale</i>
<i>A. azoricum</i>	<i>A. oxycedri</i>
<i>A. bicarinatum</i>	<i>A. pini</i>
<i>A. blumeri</i>	<i>A. pusillum</i>
<i>A. californicum</i>	<i>A. rubrum</i>
<i>A. campylopodum</i>	<i>A. strictum</i>
<i>A. chinense</i>	<i>A. tsugense</i>
<i>A. cyanocarpum</i>	<i>A. vaginatum</i>
<i>A. divaricatum</i>	<i>A. verticilliflorum</i>
<i>A. douglasii</i>	<i>Phoradendron</i>
<i>A. gillii</i>	<i>Viscum</i>
<i>A. globosum</i>	General
<i>A. guatemalense</i>	Other
<i>A. hondurensis</i>	Unknown

6. Distribution Field (DIST)

This field indicates the geographic location of the mistletoes reported in the citations. Only the location or distribution as reported in the article is listed, even though a particular mistletoe may have a much broader geographic distribution. The most precise geographic breakdown is for North America. The remaining areas have been arbitrarily handled as broad geographic regions.

General
United States, California
United States, Southwest (Ariz, N. Mex., Tex.)
United States, Pacific Northwest (Ore., Wash., Alaska)
United States, Rocky Mountain (Idaho, Nev., Utah, Mont., Wyo., Colo.)
United States, West (West of Rocky Mts., excluding Hawaii)
United States, East (East of Rockies)
Canada, West (B.C., Alberta)
Canada, East (Other provinces)
Mexico
Central America (including West Indies)
South America (including Galapagos)
Africa (including Madagascar)
Australia
New Zealand
Europe (including all of Russia and the Azores)
Asia, Near East (Turkey, Arabian Peninsula, Iran)
Asia, India (including Pakistan, Nepal, Afghanistan, Ceylon)
Asia, China (including Taiwan, Japan, Korea, Tibet)
Asia, Other (Indochina, Indonesia, Philippines, New Guinea)

Other (Pacific Islands, including Hawaii)
Unknown
Maps

7 and 8. Major and Minor Keywords (MAJK and MINK)

The major keywords describe what is considered to be the important information in the citation, while minor keywords narrow the description. The MAJK has been described as the descriptor field. No authoritative vocabulary exists for a reference collection of this sort; thus the keywords used were arbitrarily decided upon by the authors. As the index is updated, new keywords may be added. Users will be provided with new keyword lists periodically. The major (MAJK) keywords and the minor (MINK) keywords under them are:

ANATOMY

- General
- Flowers-fruit
- Root system
- Shoots-leaves
- Ultrastructure

BIBLIOGRAPHIES

BIOCHEMISTRY—see PHYSIOLOGY-
BIOCHEMISTRY

BIOTIC FACTORS (Effects on mistletoe)

- General
- Algae
- Animals (Refers to animals other than birds. Citations dealing with wild animals are keyed here. Uses of mistletoes as food by domestic animals or man are keyed under USES (MAJK) and FOOD-FODDER (MINK)).

- Birds
- Dodder
- Fungi
- Insects (Including mites)

COMPREHENSIVE

CONTROL

- General
- Biological
- Chemical
- Silvicultural
- Silvicultural, fire
- Silvicultural, pruning

CULTURE

CYTOLOGY

DAMAGE (Effects on hosts)

- Agricultural lands
- Bark
- Brooming
- Economic
- Growth

- Mortality
- Predisposition, insects
- Predisposition, fungi
- Recreational lands
- Seed crops
- Swelling
- Wood
- Yields (Both mortality and growth loss)

ECOLOGY

- Fire
- Habitat types

EMBRYOLOGY

- General
- Chromosomes
- Other

EPIDEMIOLOGY

- General
- Germination
- Infection
- Intensification
- Life cycles
- Penetration
- Seed dispersal
- Spread
- Viability

EVOLUTION

EXTINCTION (Reports of mistletoes that are very rare, endangered, or extinct)

FLORA

GENERAL BIOLOGY

GENETICS

- Hybrids
- Sex ratio

GEOGRAPHY

HOSTS

- Introduced (Host introduced into the range of a mistletoe)

HOST-PARASITE PHYSIOLOGY

INCIDENCE REPORTS

INTRODUCTION (Establishment of mistletoes outside their natural range)

MORPHOLOGY

- General
- Flowers-fruit
- Root system
- Shoots-leaves

NOMENCLATURE

PALEOBOTANY

PALYNOLOGY

PARASITISM

- General
- Autoparasitism
- Dual (Parasitism of an individual tree by two or more mistletoes)
- Hyperparasitism
- Hypersensitivity
- Mimicry (Similarity of mistletoes to host plants)

PHENOLOGY

- General
- Flowering period
- Dispersal period

PHYSICAL FACTORS

- General
- Climate
- Elevation
- Insolation
- Pollution
- Site quality
- Soil
- Topography
- Other

PHYSIOLOGY-BIOCHEMISTRY

- General
- Alkaloids
- Amino acids
- Ash analyses
- Carbohydrates
- Enzymes
- Flavonols
- Hormones
- In vitro culture
- Lipids
- Minerals
- Nitrogen
- Organic acids
- Phenolics
- Photosynthesis
- Protein
- Respiration
- Translocation
- Viscin
- Water relations

POPULAR ARTICLES

PROGRESS REPORTS

PROPOSALS (Research proposals, plans, etc.)

RATING SYSTEMS

RESISTANCE

SURVEYS

- Aerial
- Extensive
- Intensive
- Techniques

TAXONOMY

THESIS

TOXICOLOGY

USES

- General
- Folklore-legend
- Food-fodder
- Pharmaceutical
- Other

9. Abstract

An abstract is provided wherever possible. These abstracts are usually from the original article or from an abstracting journal, but the authors have prepared many of them.

Use of the System

With FAMULUS, information may be searched and retrieved in various ways. Any one or more of the fields can be searched. Searches can be broad or quite specific. Generally, the broader the search, the greater the number of citations that will be included, the higher the search costs, and the more the scientist may have to sort through the citations to get the desired information. On the other hand, very restricted searches may not always yield the information desired.

Before a search is undertaken, the person submitting the request should decide as precisely as possible what information is desired. A search of "everything available on dwarf mistletoes," for example, would yield more than 2,100 citations. The average researcher would not find such a body of information particularly useful.

Specific searches are often best and if more information is needed, additional searches can be made.

Following are some examples of recent search requests:

—Physiology-Biochemistry, all mistletoes: 366 citations.

—Hyperparasitism of mistletoes by other mistletoes: 64 citations.

—*Arceuthobium americanum*: 499 citations.

—Dwarf mistletoes as agents predisposing trees to insect attack: 33 citations.

—Folklore and legend, all mistletoes: 151 citations.

Searching by geographic distribution or genus and species (for *Arceuthobium*) can shorten the citation list and fulfill specific needs. When searching for information on a given genus or species, however, it is necessary to remember that not all citations available will be retrieved by searching for the genus or species name only. Some will also occur in citations listed as "*Arceuthobium* spp.," "Others," or "General."

To obtain adequate information about certain fields of interest, the major and minor keyword fields should be carefully examined. For instance,

if one were interested in pollen and pollination of mistletoes, the keywords to be searched might include: (1) biotic factors—insects; (2) epidemiology—pollination; and (3) palynology. Thus, some requests may require more than one major and minor keyword search.

The keyword field is the simplest method by which citations can be searched for content, because the keywords are intended to describe the principal information in the citations. Additional information may be obtained from a search of specific words in both the title and abstract fields. However, this approach to searching citations is more time consuming and costly. Thus, unless specifically requested, title and abstract searches will not be included in searches.

Requests for searches may be sent to the authors. The authors would appreciate being notified of any errors or omissions in information received from search requests to help improve the collection and keep it up to date.

Literature Cited

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Acknowledgments

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Scharpf, Robert F., Frank G. Hawksworth, and Bernard J. Erickson.

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A computer-based information retrieval system to the world literature on the mistletoes presently contains nearly 7,000 citations; about 2,100 of those are on the dwarf mistletoes. Information for each citation is included under these fields: author, date of publication, title, publication source, species of mistletoe, geographic location, major and minor keywords, and an abstract. Searches may be requested from the authors.

Keywords: Loranthaceae, Viscaceae, *Arceuthobium*, *Viscum*, *Phoradendron*.

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